



WEEKLY EPIDEMIOLOGICAL REPORT

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Are Health Impacts of Climate Change Worth Consideration for the Health Sector ?

Climate change is defined as any substantial change in measures of climate (temperature, precipitation wind or other variables) lasting for an extended period whether due to natural factors or processes or as a result of human activities. However, in the United Nations Framework Convention on Climate Change "climate change" is referred specifically to change in climate caused by human activities. Although used interchangeably, global warming, in contrast to climate change, is an increase in temperature and does not deal with other changes which are entailed in the definition of climate change. The loose reference of global warming to climate change is effected by the interlinked nature of the two phenomena.

According to the reports published by the inter-governmental. panel on climate change, the sea level has risen by approximately 20 Cm and average global temperatures by 0.6°C. It has further emphasized that if the continuation of unmodified human activities leading to global warming exists, rising temperatures and sea levels will almost certainly lead to hazardous and extreme climatic events such as floods, droughts and storms. There are no easy solutions to address climate change. Mitigation of climate change and adaptation to it has been identified as a critical area in this regard.

Climate change will have calamitous repercussions on public health. The grand coliseum of Public Health is built on a sound foundation of basic needs namely safe drinking water, sufficient food, secure shelters for inhabitants and good social conditions. Almost all of these pillars lie beyond the purview of the health sector. However, these are important determinants of health and climate change undoubtedly attacks and threatens the very existence of these foundation stones. Adaptive measures are meant for solidifying the foundation and keeping the pillars strong so as to prevent the collapse of the well being of the population.

There are overwhelming evidences to the effect

that the climate change contributes in a big way to the global burden of disease, deaths and disability. The resultant suffering is enormous. The pathways of exposure of mankind to the climate variability are two fold. Intense and extreme weather events may have direct bearing on the mankind. Indirect influence is exerted via changes in availability, quality and quantity of water, air and food which are essential direct determinants of health. The ecosystem in which man lives in equilibrium is compromised by the changing climate. Agriculture which is an inalienable part of humankind and infrastructure of the livelihood of people are devastated by the resultant climatic changes. Humans are exposed to the effect of climate change indirectly through these distal/ indirect determinants.

There are multiple pathways through which climate change exerts its bearing on human health. Socio economic disruption due to calamities will also give rise to health effects of a wide variable range. Climate change will have direct bearings on human health. The indirect effects of it on human health are also significant. Indirect effect is exerted on human health through changes in water, air, food quality, vector ecology, eco systems, agriculture, industry and settlements. Social and economic disruptions arisen due to climate change are potentially capable of impacting health status of the public. Fortunately, environmental and social conditions of the people as well as the conditions of health systems are amenable to modifications. Consequently, these can be manipulated in order to use them as interventions to positively influence the health impacts of climate change.

Direct pathways will cause temperature related illness and extreme weather related health effects. Indirect pathways are manifold. Effect on agro and eco system will result in shortages of food and ensuing nutritional effects. Hydrological impact will be reflected in effects of water shortages. Contamination of water and food

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with microbial pathogens will give rise to food and water borne diseases. Changes in disease transmission dynamics in variable weather will cause vector and rodent borne diseases. Socio economic and demographic impacts will lead to many health impacts some of which are interconnected with other factors too.

Hot days, hot nights and heat waves have become more frequent. Heat waves have directly contributed to short term increases in death. Death is determined by the severity of the heat as well as the vulnerability of the population. Elderly and out door workers are vulnerable in particular. High temperatures increase air pollutants triggering asthma. Heat stress may exacerbate heart and respiratory diseases. Green house gases cool stratosphere, prolong the effects of ozone depleting gases, increases level of UV rays. Climate change will change the cloud cover. High ambient temperature changes clothing pattern and increases out door spent time increasing people to UV exposure. Skin cancers and cataracts are caused by exposure to UV rays. The positive side of being exposed to sunlight is the prevention of vitamin D deficiency

Winds, storms and floods are extreme weather conditions that directly and indirectly influence health status. Extreme condition is death while some may sustain injuries and resultant disabilities. Exposure to water and cold climate may cause RTI (Respiratory Tract Infection). Flooding waters can be contaminated with toxic materials while bacterial, protozoa and viral contamination gives rise to water borne diseases. Communicable diseases may spread quickly among displaced population while the loss of property, loved ones and living in makeshift camps may affect the mental health status. This may be manifested in anxiety, depression, aggression and leading to suicide in certain circumstances.

The other extreme of the spectrum is drought. The extreme event is death which may be due to direct effects such as heat waves. Malnutrition expressed as under nutrition, micro nutrient deficiency and protein energy malnutrition is an indirect effect of the drought. Drought having affected crops will have an impact on food availability. Overall food consumption and food diversity are also affected giving rise to micro nutrient deficiencies. Drought is favourable for communicable diseases and spread of many viral respiratory diseases. Another aspect of the drought is the spread of diseases as a result of poor hygiene due to scarcity of water. weather determinates development, transport, dispersion and deposition of air pollutants. Ground level ozone is a secondary pollutant formed through photochemical reactions in the presence of bright sunshine, temperature. Increased levels of ozone increases hospitalisation for respiratory complications such as chronic obstructive pulmonary disease, asthma, allergic rhinitis, etc. Death may occur prematurely. Formation of particulate matter depends partly on temperature and humidity. Increasing particulate matter has negative implications reflected in disease and death. Climate change has also caused early generation of aero allergens such as pollen causing hay fever, allergic rhinitis and bronchial asthma.

Increased temperature provides favorable conditions for multiplication of bacteria or their products. It has been demonstrated that salmonellosis can be on rise in the event of increased temperatures. The same applies for breeding of mechanical vectors that mechanically contaminate food. Rising sea water temperatures have been attributed for shell fish poisoning among consumers. Water related diseases are water borne and water washed. Water borne diseases are caused by ingestion of pathogen via water while Water washed are those due to lack of hygiene. Extreme climate changes affect

the availability of water and its quality. Lack of water may cause water washed diseases like scabies and pediculosis while contamination of piped and surface water may cause water borne diseases. Research point out that overall there is an increased diarrhoeal disease incidence with increased temperature. These water borne diseases include Cholera, Hepatitis A, Poliomyelitis, and Typhoid Fever. It includes parasitic diseases such as ameobiasis, giardiasis etc .

Climate change will have an immense impact on availability of water and food. Food and water shortages are inter related. However the relationship between climate change and nutrition are complex. Having affected crops and livelihood infrastructure, climate change unbalances dietary diversity while the overall consumption goes down. Acute and chronic nutritional problems tend to surface. Poor nutritional status makes victims susceptible to infections. In turn, infections cause malnutrition. This vicious cycle continues increasing the burden of infectious disease among vulnerable people.

Not only in health arena, in any given sphere, resources are scarce and as a result target groups for interventions have to be determined with a view to implementing interventions in a cost effective manner. However, no one is spared from the effects of climate change. In other words, all can be considered as " at risk population". However, there is a variable risk in health effects initially. Many factors will determine the risk status. These are Individual as well as societal factors determining the vulnerability of a given population. Elderly population, children, women, poor income groups, disadvantaged, marginalized groups, the disease or disability status are factors of vulnerability. Broader social environmental factors such as disaster preparedness, health sector response, access to primary health care and environmental degradation are also important factors of vulnerability. Even if individual factors are accounted for, the societies which are not prepared for disasters, with poor public health systems and disparities in access to basic health care and gross environmental degradation are at higher risks than well organized societies to meet up with the challenge. These factors determine the highest vulnerability of people living in low resource countries in contrast to their counterparts in high resource settings.

Is there a way out of these issues which have emanated as a result of the actions of the mankind. Fortunately, many effects of the climate variability are amenable to modifying effects which will mitigate the effects if not eliminated totally. The terminology for these modifications is called adaptation. Adaptation is defined as *Adjustment which moderates harm or exploits beneficial opportunities in natural or human systems in response to actual or expected climatic stimuli or their effects.*

There are types of adaptation namely anticipatory, planned and autonomous. However, from health perspective, for us primary, secondary and tertiary adaptations have a huge meaning. All activities which are geared towards prevention or minimizing climate change per se is primary while specific actions implemented to minimize or eliminate the health effects that were described upfront in this article are secondary adaptive measures. If and when effects strike individuals, specific measures such as treating a patient to save him from death, cure the disease and prevent the disability are tertiary adaptations.

(This article compiled by Dr.Ranjan wijesinghe, Consultant Epidemiologist)

Table 1: Vaccine-preventable Diseases & AFP

14th February - 20th February 2009 (08th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	01 KL=1	00	00	00	00	00	00	01 BD=01	00	02	02	10	10	00.0%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	00	01 KD=1	00	00	00	00	01 PO=1	00	00	02	07	20	18	+11.1%
Tetanus	00	00	00	00	00	00	00	00	00	01	01	06	06	00.0%
Whooping Cough	01 KL=1	01 KD=1	00	00	00	00	00	00	00	02	01	14	06	+133.3%
Tuberculosis	53	11	02	10	00	03	00	00	00	79	227	1227	1572	-21.9%

Table 2: Newly Introduced Notifiable Disease

14th February - 20th February 2009 (08th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	62	18	27	19	08	34	18	5	22	213	91	872	801	+8.9%
Meningitis	03 GM=1 KL=2	00	02 GL=1 MT=1	01 MN=1	02 KM=1 BT=1	01 KR=1	00	00	04 RP=2 KG=2	12	33	155	305	-49.2%
Mumps	05	02	01	05	02	04	03	03	05	30	37	298	351	-15.1%
Leishmaniasis	01	00	04 MT=4	00	00	00	02 AP=2	00	00	7	Not available*	57	Not available*	-

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.
 DPDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matala, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

Table 3: Laboratory Surveillance of Dengue Fever

14th February - 20th February 2009 (08th Week)

Samples	Number tested	Number positive	Serotypes *				
			D1	D2	D3	D4	Negative
Number for current week	02	00	00	00	00	00	00
Total number to date in 2009	12	02	00	00	02	00	00

Sources: Genetic Laboratory, Asiri Surgical Hospital

* Not all positives are subjected to serotyping.
 NA= Not Available.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

14th February - 20th February 2009 (08th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	34	391	4	32	0	3	4	53	0	7	2	47	0	2	2	13	0	1	92
Gampaha	21	209	4	25	0	5	2	9	3	8	6	35	0	3	0	20	0	0	79
Kalutara	15	104	4	65	0	2	1	16	0	4	3	27	0	0	0	3	0	0	100
Kandy	21	327	5	66	0	0	0	3	0	0	6	45	4	23	0	10	0	0	80
Matale	8	105	1	21	0	0	0	8	0	2	2	94	0	2	0	2	0	1	75
Nuwara Eliya	1	16	1	48	0	0	1	43	0	20	3	14	2	9	0	7	0	0	69
Galle	6	22	5	34	0	3	0	0	0	2	6	36	0	1	0	4	0	0	100
Hambantota	4	35	3	21	0	5	0	1	0	4	0	10	6	17	1	4	0	0	91
Matara	7	135	3	58	0	2	0	4	0	3	4	34	1	39	0	0	0	0	100
Jaffna	0	5	2	20	0	3	4	37	0	18	0	0	0	53	0	2	0	1	50
Kilinochchi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mannar	0	2	0	8	0	0	5	51	0	0	0	0	0	0	1	5	0	0	50
Vavuniya	0	4	0	5	0	0	0	2	0	1	0	2	0	0	0	0	0	0	50
Mullaitivu	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Batticaloa	9	56	3	30	0	6	0	4	0	5	0	2	0	0	0	1	0	0	55
Ampara	0	13	1	5	0	0	0	5	0	0	2	5	0	0	0	3	0	0	71
Trincomalee	0	25	1	19	0	1	0	0	0	0	0	1	0	2	0	3	0	0	60
Kurunegala	17	146	4	34	0	3	2	10	0	1	6	26	3	39	0	10	0	2	84
Puttalam	3	23	0	28	0	5	5	26	0	0	0	9	2	14	0	2	0	1	89
Anuradhapura	3	12	4	18	0	1	0	1	0	2	2	47	2	12	0	3	0	0	58
Polonnaruwa	1	15	0	10	0	1	0	6	0	2	0	27	0	0	0	1	0	0	71
Badulla	0	16	2	57	0	2	0	11	0	13	4	24	1	17	6	52	0	0	87
Monaragala	2	7	1	11	0	0	0	6	0	2	0	5	2	19	0	9	0	0	91
Ratnapura	3	45	11	97	0	5	2	18	0	1	2	13	5	9	1	4	0	1	67
Kegalle	22	158	1	22	0	1	1	8	0	1	3	20	0	7	3	28	0	1	73
Kalmunai	2	54	0	35	0	1	0	5	0	0	0	2	0	1	0	2	0	0	54
SRI LANKA	179	1925	60	771	0	49	27	328	3	96	51	525	28	269	14	188	0	8	75

Source: Weekly Returns of Communicable Diseases (WRCD). 0

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 21 February, 2009 Total number of reporting units =311. Number of reporting units data provided for the current week: 234

A = Cases reported during the current week. B = Cumulative cases for the year.

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